Дистрибуирани софтверски системи
Технички факултет "Михајло Пупин" Зрењанин, Универзитет у Новом Саду
Скрипта за лабораторијске вежбе #03 [нерецензирани материјал]

Introduction to client side web development

World Wide Web (WWW) uses **Hypertext Transfer Protocol (HTTP)** for communication between clients and web servers. For creating and formatting documents **Hypertext Markup Language (HTML)** is used. In web environment we can distinguish:

- ❑ **Web clients**

  - o Connected to the Internet when there is a need.

  - o Usually runs web browser (client) software such as Firefox or Google Chrome.

  - o Uses HTTP for communication with web servers.

  - o Requests web pages from a web server.

  - o Receives web pages and files from a web server.

- ❑ **Web servers**

  - o Continually connected to the Internet.

  - o Run web server software (such as Apache, Internet Information Server (IIS), Tomcat, etc.).

  - o Uses HTTP for communication with clients.

  - o Receives a request for the web page from clients.

  - o Responds to the request and transmits the status code, web page, and associated files.

During the exchange of files between clients and servers, the type of files being transferred is indicated with **Multipurpose Internet Mail Extensions (MIME)** types. MIME type is used by web browser for deciding how to present files.

A Uniform Resource Identifier (URI) is resource identifier on the Internet, while a **Uniform Resource Locator (URL)** is type of URI for representing network location of a resources such as web pages, graphic files etc. URL consists of the protocol (HTTP), the domain name and the hierarchical location of the file on the web server. Example:

https://www.w3schools.com/html/html_intro.asp

- ❑ https - protocol
- ❑ www.w3schools.com - domain name
- ❑ /html/html_intro.asp - hierarchical location of file at web server

Basic technologies for developing client side of web applications are:
- ❑ **HTML** - the language for building web pages,
- ❑ **CSS** - the language for styling web pages,
- ❑ **JavaScript** - the language for programming web pages.

NOTE for Tomcat: All files of type *html, *.jsp, *.css, *. js and image files should be placed in the root folder of a web application deployed at Tomcat. After changing these files there is no need to restart Tomcat.

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HTML Basics

Hypertext Markup Language (HTML) is a markup language that contains the set of markup symbols or codes placed in a file aimed at displaying on a web page. These markup symbols and codes identify structural elements such as paragraphs, headings, and lists. HTML can also be used to place media, such as graphics, video, and audio on a web page. For collecting data from users HTML uses fill-in forms. The web browser interprets the markup code and presents the page.

Each individual markup code is referred to as an **element** or a **tag**. Each tag has a specific purpose. All tags are enclosed in angle brackets. Example is>

<div align="center">

`<TagName>`

</div>

Most tags come in pairs, containing an opening tag and a closing tag. These tags act as containers for the content. For example, the text for defining the title of a web page is between the <title> and </title> tags.

The most recent standardized version of HTML used today is **eXtensible HyperText Markup Language (XHTML)**. XHTML uses the tags and attributes of HTML4 together with the syntax of XML. XHTML has been used on the Web for over a decade. Recently W3C decided to move forward to **HTML5**. HTML5 is intended to be the successor to HTML4 and will replace XHTML. HTML5 incorporates features of both HTML and XHTML, adds new elements of its own, provides new features such as form edits and native video, and is intended to be backward compatible.

The type of markup language used in a web page document is identified with a **Document Type Definition (DTD)**. Browsers and HTML code validators use the information in the DTD when processing the web page. The DTD statement, commonly called a **doctype statement**, is the first line of a web page document. The DTD for HTML5 is:

<div align="center">

`<!DOCTYPE html>`

</div>

The simplest structure of HTML web page is:

```
<!DOCTYPE html>
<html>
      <title>Web page title</title>
<body>
      <h1>Level 1 heading</h1>
      <p>A paragraph with text.</p>
</body>
</html>
```

Head section

The head section includes element such as the title of a web page, meta tags (meta elements) for describing the document (such as the character encoding), and references to external scripts (*.js) and styles (*.css). Many of these features are not visible on the web page.

Common practice is to use a **character-encoding** set that is widely supported, such as **utf-8**, which is a form of **Unicode** (http://www.unicode.org).

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Body section

The body section contains text and elements that display directly on the web page in the web browser. The body section contains the content of a web page.

CSS Basics

Cascading Style Sheets (CSS) are used in web pages for separating the presentation style of a web page from the information on the web page. CSS is used for styling text, color, and page layout.

The advantages of using CSS:

- ❑ **Better control of typography and page layout**. These features include font size, line spacing, letter spacing, indents, margins, element positioning etc.

- ❑ **Separating style from structure of web pages**. The format of the text and colors used on the web pages can be configured and stored separately from the body section of the web page document.

- ❑ **Styles can be stored**. You can store styles in a separate document and associate them with the web page.

- ❑ **Web page documents are smaller**. The formatting is separated from the document, leading to the smaller web page documents.

- ❑ **Easier maintenance of web pages and web sites**. Styles are maintained separately from web content in web pages.

Ways for inserting CSS in web page documents:

- ❑ **Inline styles** - styles coded in the body of the web page as attributes of HTML tags.

- ❑ **Embedded styles (internal styles)** - styles defined within a style element in the head section of a web page. These style codes apply to the whole web page document.

- ❑ **External styles** - styles coded in a separate text file (*.css), which is associated with the web page by configuring a link element in the head section.

External Style Sheet

Sample CSS document (mystyles.css) is:

```css
body {
    background-color: yellow;
}

h1 {
    color: blue;
    font-size: 25px;
    font-weight: bold;
    margin-left: 11px;
}
```

Including external CSS document in a head section of a web page is:

```html
<head>
<link rel="stylesheet" type="text/css" href="mystyles.css">
</head>
```

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JavaScript Basics

JavaScript is a scripting language whose commands can be included and executed within HTML files. Using JavaScript makes web pages dynamic. JavaScript is object-based, client-side scripting language interpreted by a web browser. JavaScript is considered to be object-based since it works with the objects associated with a web page document: the browser window, the document itself, and elements such as forms, images, and links.

JavaScript code can be included in HTML documents in the following ways:

❑ **In HTML document** JavaScript code must be inserted between <script> and </script> tags.

❑ **JavaScript code placed in external file** (*.js) and included in head section of an HTML document. This is useful for including the same JavaScript code in several HTML document.

Example of JavaScript included in a head section of HTML document is:

```
<!DOCTYPE html>
<html>
<head>
<script>
    function myFunction() {
        document.getElementById("demo").innerHTML = "Paragraph changed.";
    }
</script>
</head>
<body>
    <h1>A Web Page</h1>
    <p id="demo">A Paragraph</p>
    <button type="button" onclick="myFunction()">Try it</button>
</body>
</html>
```

Example of including external JavaScript file in HTML document is:

```
<!DOCTYPE html>
<html>
<head>
<script src="MenuScripts.js"></script>
</head>
```

There are several web sites and books for learning and mastering JavaScript programming, like:

❑ https://www.javascript.com/

❑ https://www.w3schools.com/js/default.asp

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Literature and Links

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